COST AND MANAGEMENT

PROFIT

Planning a Profit Improvement Programme . . .

By F. R. Manuel

Implementing a Profit Improvement Programme . . .

By G. E. Morden

A Cost Accounting System for the Manufacture of Paint . . .

By J. R. Arbing

LOSS

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Mr. Morden is general manager of Brinton-Peterboro Carpet Co. Ltd., Peterborough, Ontario. Prior to joining this company in 1953, he was employed with Canadian Marconi Company as sales representative, sales manager of several departments, merchandising manager and manager of broadcast television receiver division. He has completed sales and general management courses in Montreal and New York City.

Since 1952 Mr. Arbing has been employed as an assessor with the Income Tax Division of the Department of National Revenue and, in addition, instructs evening classes at Western Technical-Commercial School in Toronto. A native of Prince Edward Island, he received his B.A. degree from Dalhousie University, Halifax, in 1951 and his B.Comm. degree the following year. He is a member of the Registered Public Accountants' Association of Nova Scotia and a Registered Member of S.I.C.A.

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Christmas Message . . .

This year of our Lord 1957 may long be remembered as the year in which man first extended a probing finger into outer space. The star of man is in the ascendancy and the future holds unlimited promise for those with the imagination, the vision, the resources and the knowledge to adapt the laws of nature to our needs.

In the Western world we are united as never before in the pursuit of scientific knowledge. We have no other course. The compass is set for us by the pressure of world events and there is no turning back.

Here in Canada, we have a responsibility to develop our powers and resources to the utmost. Our spirit must grow. Our knowledge must expand. Our productivity must increase. Our prestige must be great, if we are to fulfil our promise as the land of the future.

Our Society, too, has a responsibility. From our vantage point of the industrial front, each and every one of us must spearhead the advance. Our growth in the past has been considerable. With your continued loyalty and cooperation, we shall carry on our progress.

Yet, in our advance, we must be careful to preserve the essential humanity of our beliefs. Progress is for man and not man for progress. In the lull of reflection that Christmas brings, let us reconsider the sacred principle on which our civilization is based—Christianity. If the star of man rose in obedience to natural laws, the star of Bethlehem rose in transcendance of those laws. If we sacrifice our beliefs to blind and militant forward marching, then we have gained the world and lost our souls.

As Christmas rings out over the land, your Officers and Directors join me in sincerely wishing you and yours

A Merry Christmas

and

A Happy and Prosperous New Year

Maxwell C. Coutts,
PRESIDENT

C. & M. Round-Up . . .

By N. R. Barfoot, R.I.A.

LOOKING AHEAD

Credit Restrictions Easing?—Brakes are being taken off the money supply situation. Question is . . . will it be soon enough to alleviate the situation in housing and allied trades?

—o—o—

Telephone News—You can now dial a telephone number and get a three minute news summary (in Germany). Something for the telephone companies in this country to consider as a service.

—o—o—

'58 Auto Boom—is in prospect. Auto industry officials are talking of a better than 400,000 car year in Canada or about 1.25 billion dollars.

—o—o—

Computer Speed is really something. The latest is a unit that can read or write on magnetic tape a full length novel in 15 seconds.

—o—o—

Collapsible Tank Car has been designed in the U.S. It is a rubber coated fabric elongated bag for use with standard trucks and railroad cars. Made in gallonage from 6500 to 20,000. May be used also in barges or for industrial storage. Priced under $2,000.

—o—o—

Microfilm printer enlarges microfilm for on the spot reading. In less than ten seconds it can deliver a ready to use eight by ten inch print of any frame.

—o—o—

OF GENERAL INTEREST

Computers may not be the answer to all your problems. Here are a few selected comments:

Keeping up with the Joneses is often the real reason for computer installations. The typical installation of this type is characterized by the transfer of already highly mechanized operations to the computer, resulting in only slight increases in speed and significant cost increases.

The experimental approach is used by some. A computer is installed without knowing for sure in advance how it will be most helpful. The attitude is that it ought to succeed in this or that application but there is no experience in other companies.

The cost savings approach is a good one, but many companies, when they become aware of the amount of work involved in reaching a well-reasoned conclusion, abandon their original approach.

The net gain of transferring an already mechanized operation to the computer will rarely bring any advantage.

Payroll is normally not a profitable computer application. The transfer of a good, well-organized payroll from conventional equipment to a computer almost always results in higher costs with little or no benefit.

It is quite clear that the real gains in this field are in the area of integrated data processing, breaking down paper handling and handling source documents only once.

It is also clear that this is a tremendous design job covering many man years.

—o—o—

Peculation is more common than you think. Estimates range from one-half to three billion dollars stolen annually on this continent by embezzlers of company funds.

This is a greater amount than that stolen by all the professional criminals together.

These crimes are rarely reported to the police since most companies shun adverse publicity and tend to write off the experience as a one-time occurrence.

Most big firms have tight internal controls and meticulous internal auditors.

The small business man is the one who seems to be most firmly convinced that it can't happen here.

This thief is the soul of respectability. He works hard, is a good mixer, in his thirties, married, one or two children, drives a medium priced car. Sometimes a church officer, and seems willing to accept responsibility.

Among the many ways of manipulation, these are typical:

Failing to record returned goods and pocketing equivalent amounts of cash.

Keeping portions of collections and offsetting them by improper credits for discounts and allowances.

Forging cheques, destroying them when returned by the bank.

Padding invoices in return for kick-backs.

Raising cheques and invoices and keeping the difference.

Stealing from the cash register and correcting the tape.

Padding payrolls and kiting receipts.

—o—o—

ON THE PERSONAL SIDE

Auto Insurance jump

Early in '58 rates will rise 10-15%.

Frequency of claims is fairly stable but cost of claims is up sharply. Expenses, of course, like everything else, are higher.

Insurers, on the average, are losing money.

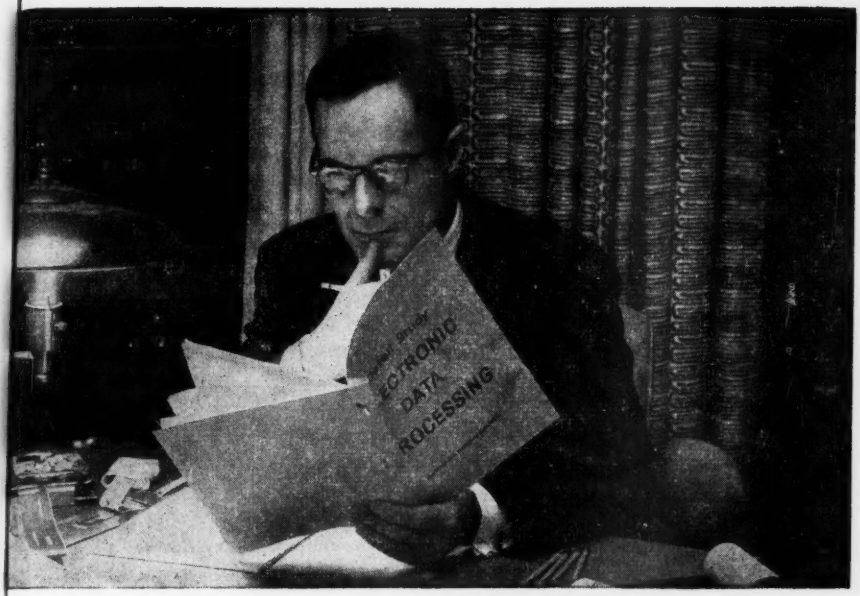
—o—o—

Record boom—Retail sales of phonograph records totalled 13 million two years ago. Last year the figures were 19 million and this year it is heading for 25 million.

—o—o—

Make money at home schemes are a 500 million dollar a year business in this country.

Your Life Insurance dollar—74 cents of each dollar taken in comes from premiums, the balance of 26 cents comes from earnings on policy holders' funds. Of each dollar paid out, 43 cents is to living policy holders and beneficiaries. 39 cents is invested in future benefits and 18 cents is for operating expenses, taxes, licenses and fees to the government.



IBM

Your top management wants data processing information . . .

here's how you can help!

Whether or not your company shares in the benefits of electronic data processing may well depend upon you.

As you know, there should be no "snap judgments" on electronics. It takes careful study. But, this effort to gather the facts, re-examine procedures and review management requirements can prove extremely rewarding. The individual nature of **your** business **demands** that management know exactly when, where and how electronic data processing can fit your special needs. Whether or not your company decides for electronics, this re-examination of systems and procedures yields vital economies. The important point is that you start now so that these electronic economies are yours sooner.

Many hundreds of IBM electronic data processing machines are on the job in virtually every type of data processing application. Each working day, one or more of these electronic machines are being delivered to businesses — large and small. You can be sure, therefore, that in this rapidly growing field, IBM has the experience and know-how you can depend upon. What's more, newer IBM developments will assure your staying out in front.

For the down-to-earth facts about **electronics for business,** talk to your local representative or write: International Business Machines Company Limited, Don Mills Rd., Toronto 6.

IBM DATA PROCESSING

PERSONALS

Darrell Campbell, Vice-Chairman of the Vancouver chapter, has been appointed General Accountant of the Canadian (B.C.) Telephone and Supplies Ltd., Vancouver.

Clifford Cole of the British American Oil Co. Ltd. has been transferred from Calgary to Vancouver. Mr. Cole is a student member.

J. H. Reid, C.A., an immediate Past Chairman of the Toronto chapter, has been elected President of Standard Paving & Materials Ltd.

D. B. Grant, B.Com., R.I.A., F.C.I.S., has been appointed Comptroller and Assistant Secretary-Treasurer of Joy Manufacturing Company (Canada) Limited, Galt, Ontario. He was formerly with Vancouver Iron Works Ltd.

Léopold Girard, R.I.A., has been named Second Vice-President of the Quebec Retail Lumber Association. Mr. Girard is a former Chairman of the Quebec Chapter.

Marc Lehoux, M.ScC., C.L.U., Chairman of the Quebec chapter, has been nominated Secretary-Treasurer of the C.L.U. (Quebec City Division).

Robert S. Mann, C.P.A., a member of the Hamilton chapter, has been appointed General Manager of Brantford Coach and Body Limited, Brantford. Mr. Mann was formerly Comptroller of the company.

Planning a Profit Improvement Programme. . .*

By F. R. MANUEL,
Vice-President,
Stevenson & Kellogg Ltd.,
Toronto, Ont.

Any profit improvement programme must be planned around facts, people and controls, the author points out. Under these three headings he outlines some of the more important areas of consideration in planning a programme of change which is the basis of all profit improvement.

IF YOU are going to have profit improvement, you must plan a programme of change. You are going to do something new, or you are going to do some things in a new way. Now, it seems to me that this suggests three general areas of consideration:

—what to change

—who will accomplish the changes, who will be affected

—and, how to maintain those changes effectively.

Though my subject is dealt with under these three headings, I appreciate that as a practical matter you cannot separate people from facts or controls—people dig out facts and manipulate data; they devise and operate controls.

General Considerations

Before we get into the area of fact finding and analysis, there are two important aspects of profit planning strategy to consider. One is that you always keep checking your facts for perspective. Ask yourself "How important is this in light of the total operation?" You can't correct or change everything at once. You would be misusing your time, for instance, if you put all your efforts on a scrap and reject programme that might show a $10,000 improvement when with equivalent energy, labour costs could be reduced by $50,000. One must always be aware of the economy of effort and the significance of facts.

The other consideration hinges on a dictionary definition for profit: "excess of returns over outlay". I am going to suggest that in most accounting statements, many accountants are too literal in the interpretation of this definition. "Revenues" and "outlays" are treated as homogeneous entities—as if they all had the same characteristics and behaviours. Now it is a fact that some expenses are very directly related to the activity of a business (or segments of the operation) whereas others remain at a quite constant level in spite of a considerable change in the rate of activity. But the conventional operating statements do not recognize these inherent conditions of doing business. They are static "snapshots" when what we need for measuring change and planning for change are "moving pictures". So, if you are going

*An address to the Ontario and Quebec Regional Conference of the Society of Industrial and Cost Accountants in Ottawa on November 1 and 2, 1957.

to do a meaningful job in this phase of establishing the basic facts for profit improvement, it will be necessary early in the programme to get in behind the "front" of normal profit and loss statements to find out what really contributes to profit and what drags it down. In planning for change, the value of analyses to develop direct and variable costs, to identify constant costs and to determine relative contributions to overhead and profit cannot be emphasized too strongly. These are among the elements you are going to manipulate when planning for improved profits.

FACTS

Very frequently in the past, and occasionally now, I have been confronted with the statement "but our business is different". I am prepared to concede that position—to a degree. Though I am going to refer to various areas of activity in business—manufacturing business, in particular—and to functions within those areas, I realize that they can have varying degrees of significance from company to company. Consequently, I intend to discuss, and present examples in some instances, those aspects of profit planning that are not always considered as frequently as they should be. At the same time, I would like to refer to the application of some of the newer management techniques.

Market Analyses

Market analysis may provide some specific direction for your sales planning. Like a company I know, you may be happy with the rate of growth of your sales. The company, most of whose sales were to one particular industry, had doubled its volume in the past ten years. However when the growth of the customer industry was determined, it was found to have had an eightfold increase in the same ten year period. Promotional activities have to be revised if you want to regain a larger share of the market in a situation like that.

Possibly a study for markets and your proportion of them will disclose a rather different picture. For instance, there is a firm in the dry battery business which manufactured battery packs for use in the large non-portable radios used in rural areas. Its share of that market was increasing but the market potential was diminishing as hydro networks expanded. Obviously, they had to diversify and strengthen the sales efforts on others of their products if they were even to maintain profits.

A knowledge of the comprehensiveness of the market coverage may influence profit planning. An electrical manufacturer is an illustration. This manufacturer has concentrated on new building construction However, these products have a good market at better "mark-ups" in the replacement of obsolescent equipment in older buildings. This is an interesting potential for this particular company; yet one which requires well planned strategy for profitable development.

Products or Services

Closely associated with a study of markets, there is the review of products or services. Your customers' requirements change—or are

changed by your direct or indirect competitors. New raw materials or improved ingredients and components should be carefully considered for the possibility of application to your particular products. Let me assure you that our business—that is, management consulting—is not different from any of yours in this respect. In the last few years, the industrial engineering function has developed the use of predetermined motion-times and, currently, there is being introduced the technique of memomotion. On the other hand, the office, the plant and the warehouse are sharing an increasing awareness of the common nature of much of their information through the application of integrated data processing. The mathematician is joining the accountant, the engineer and the scientist in developing better information on which to base management decisions—operations research. You cannot afford to overlook the new technological developments in any profit planning.

Packaging

Running along with products is the trend in packaging. We have all observed the movement from the barrel or bag to the cardboard box to the "giant economy" size in household products. Have you bought any nails recently? They now come with heads, without heads; smooth —grooved—spiral—and all handy to pick up in a one pound package. Could you reach more users and price for a better margin if you had a good thorough look at the "wrappings"?

Distribution Costs

Now I am going to turn from markets and products to the cost of getting the two of them together—distribution costs. I don't know if accounting departments are afraid of sales departments or whether they have put sales up on a sacred pedestal. At any rate, as a rule, the expenses which are incurred to get products from the production line to the customers are not nearly as thoroughly worked over as the costs to get them from the receiving door to the shipping door.

Furthermore, there seems to be a reluctance in some quarters to frankly report what it really costs to get the sales. I often see operating statements which start off with net sales. When you inquire: "Net—after what?", you will find that it is not only net after returns but that it is net after discounts and freight. Well, that is one way of doing it, but it certainly does not disclose all the facts about costs of selling to that particular company's customers. I'll go along with starting to accumulate sales figures after a uniform trade discount has been deducted; but when it comes to special discounts because of the class of customer or size of order, for instance, I think you make analysis towards profit planning a good deal more difficult than it need be. And freight treated as a lump sum, whether it is deducted before net sales or not, certainly does not throw any light on the cost of distribution to certain customers or territories.

If you have not already done it, I recommend that you conduct a distribution cost analysis. And while you are at it, classify expenses by their characteristics and behaviours, so that you can see comparative rates of contribution to profit.

Such fact-finding will start out, first, following the pattern of your particular sales organization. It will assign all expenses that can be attributed to an activity or responsibility, such as: a branch, a territory, a salesman. Then you may want to look at the relative profitability of products or product groups in those areas.

Then, there is the sort of cost analysis in the selling function that usually requires some extra digging — but none-the-less worthwhile digging. Here are three examples of what I mean:

Type of customer: What is the "revenue-outlay" picture for selling direct as against selling through jobbers or distributors? I know a company that re-organized its entire selling effort on the strength of the answer to that question.

Size of customer: Do the special concessions to the big fellows pay off? Or, is it profitable or absolutely essential that you service the little fellows? As an interesting by-product of this effort, you will confirm "how many of your eggs are in what few baskets"—a serious concern to many companies in their planning.

By size of order: Many sales policies as to minimum order size or the institution of service charges have resulted from a careful study of all the costs that are incurred from opening the mail containing an order to despatching the order in the mail.

The Manufacturing Area

In marketing, we place the greater emphasis on increasing or maintaining the volume of sales—at the same time determining those regions, those customers and those products that will result in the optimum profit return. Secondarily, we are concerned with an examination of our distribution costs to ensure that they are wisely expended.

On the other hand, in manufacturing, we should direct our attention first to cost reduction. In that direction you will probably find the most fruitful profit improvements. At the same time, we must be conscious of those factors that contribute to the sales picture:—factors such as: quality of product and timeliness of deliveries.

In the majority of manufacturing operations, of course, materials and labour are the predominant portions of cost. True, the relative importance of one or the other will vary markedly. In the process industries, such as petroleum, chemicals and paper, materials will bulk large. Outside the manufacturing field, you will find this same relationship; in retailing, for instance. Contrary-wise, in the service businesses —insurance, finance and such like (including management consulting) you find no materials worth speaking about but salaries bulk very large in operating expenses.

Labour Cost Reduction

Usually of the two, in manufacturing, it is relatively much easier to achieve a reduction in labour cost than in materials cost. The explanation for this is quite simple: Materials are measured and specified rather closely; you cannot use 500 pounds of flour when the mix requires 400 pounds, or stamp out a 25 inch part when the assembly can only accommodate a 20 inch piece—and end up with the right product. But, believe me, we see operations only too frequently where five hours' labour is employed instead of four—all because the method has not been adequately set up and the labour requirement established.

Unless you have an active methods programme and currently accurate labour standards, you can use the following guides to judge the significance of direct labour cost reduction for your particular improvement programme. Many years of experience in a variety of manufacturing plants has shown you can expect 10 to 15% improvement from a detailed methods programme and an additional 15 to 20% from work measurement and wage incentives.

Quality Control

Aside from changing specifications or re-designing the product—possibilities that should be carefully explored—material costs can best be reduced by a quality control programme. To be really productive of savings such a programme should be comprehensive: from receiving to finished goods, with the required in-process control. It should deal with yields, losses, scrap, re-work and such like. And while you are at it, don't overlook the use of statistical methods both from the standpoint of better control and for economy in the activity.

Production and Inventory Control

While we are on the subject of materials and products, we must not overlook the profit improvement potential of production planning and inventory control. One of the benefits you can measure directly is a lower investment in inventories. One company with which I am familiar, increased the inventory turnover from four and one-half to five and one-half times per year. We know that it costs about 20% per year on the average to carry inventories. So it is possible that you should include this sort of thing in your own planning.

Though it is difficult to measure its exact effect, the ability to more readily supply your customers' requirements may have an even greater impact on profits than reduction of inventories.

The setting up of an adequate plan for the control of inventories and production can become rather involved. For example, we have in hand a situation right now where the basic procurement and inventory policy is under revision. The operation we are directly concerned with is a subsidiary. The parent company has insisted on a low inventory balance at a time when the subsidiary should be high on raw materials

and components. The procurement cycle is long on critical parts. As a result, the division in question is less than 75% effective in meeting the available sale of its products. So, inventory and production planning can be more than a system. It is a philosophy of doing business.

If you have one of the more complex problems of this type, investigate the application of one of the operations research techniques, known as linear programming. It can resolve a number of variables and give you facts for planning and decisions that are available in no other way.

Manufacturing Facilities

Manufacturing facilities are sometimes "skipped over lightly" in the analysis for profit planning. Buildings, machinery, material handling equipment and plant layout, all deserve study in light of your own unique circumstances.

Buildings and machinery generally require the heaviest capital expenditures. They are dismissed occasionally as "expensive". However, it could be that, competitively, you cannot afford for too long to put off re-equipping in light of today's technology.

As Mr. Morden will point out in his situation, you not only look at equipment for its efficiency for existing products; but you must look at equipment needs in terms of what you should be producing to meet a changed market demand.

It is not easy to justify a dismissal of layout and material handling studies. The cost of the indicated changes is usually not exorbitant. And, if such a study has not been made for some time, the results can be quite gratifying. I can recall an example that is not exceptional. It is a box-making department employing only a few men. The savings from layout and the addition of conveyors along with some modifications of equipment resulted in savings of $10,000 a year for a one-time expense of about $6,000.

"Buy-or-Make"

There is a problem that crosses several organizational lines. It may involve sales. It certainly includes manufacturing and purchasing. Decisions in the matter usually are made at the top of the organization. I refer to the "*buy-or-make*" *questions.* Frequently, there are rather involved considerations, such as: alternative use of facilities; what *is* our cost of this component or product? quality and reliability of outside suppliers. It is not always easy to get a rational decision, either; there can be a sentimental attachment to a department or an operation.

But, the right answer to a make-or-buy question can be significant. A company which I know well, had a diminishing foundry operation. Before the advent of die-casting and welded components, the foundry had been a "hub" in the plant. With some sighs and misgivings, it was finally abandoned. Immediately core-making and the pouring floor yielded badly needed space. The dollar return per square foot increased several fold.

Data Processing

The technological developments in data processing equipment have been startling—both in versatility and complexity. However, these developments have been accompanied in some instances by a bit of hysteria to "keep up with the Joneses". We have seen some installations where it would seem that a patent medicine had been purchased without determining what the ailment was.

Integrated data processing is not necessarily a cost reduction scheme —in that equipment replaces people. Rather, the savings may arise in the changes that take place because a whole system of reporting and manipulating information has been reviewed at one time.

On the other hand, data processing need not save anything in itself. It may well be justified through producing faster and better information for profit-making decisions. It may enable better service to customers with an even lower inventory.

Except for processing the results of a special study on rented time, the use of electronic data processing equipment is pretty well confined to large installations up to now. But some form of integrated data processing is a possibility for many medium sized and even small companies. For instance, we know of procedures where the companies prepare their basic data so that it can be processed at a service bureau.

To get the maximum benefits from data processing, you must, first, make a thorough and complete study of your needs. You should not confine yourself to one department if you are truly going to integrate. Secondly, you must know the capabilities and characteristics of all the equipment that is available. Finally, you design a flow and system to meet your requirements and incorporating the units that will do the job most economically.

Organization

Finally in the analysis stage of profit planning, you must consider organization structure. This is a bridge between facts and people because organization is people.

A substantial proportion of the "constant" or "escapable fixed" expenses in most companies consists of salaries. Those salaries are incurred because of your particular type of organization. I recommend that you take a good thorough look at the organization structure in light of today's needs and your plans for tomorrow.

Be sure that those things which need doing are being adequately covered. Find out if they are being done at the right places for effective administration and control. Further, ensure that the members of your organization know what their jobs are, and know the duties and responsibilities of those with whom they are in contact. The preparation of adequate position descriptions is a revealing experience. Organization planning is a rewarding exercise.

PEOPLE

I think people are really the most important aspect of planning a profit improvement programme. Any success that you have is going to be achieved through people—both within and outside your company.

The fact gathering and analyses are carried out by groups or individuals. Ideas and plans for improvement are created and developed by the same or different persons. Decisions will be made by you and your associates. Many people may be involved in the accomplishment of the goals—suppliers, production workers, staff, distributors and customers. Again you, your associates, and your staffs, will be required to measure progress and amend the plans as you follow through the programme. Superimposed on all these activities is change—something which each of us as individuals instinctively resist unless it is our own idea or one which we are prepared to accept.

Define the Target Area

First, you and your associates must get your heads together and decide what are your particular problems. Your list should be discussed thoroughly until you reach agreement on the priority of those problems and are able to express the problems in writing.

Next, you should arrive at an estimate of what it would be worth to solve each problem—the benefits which could accrue, and the costs of attaining those benefits. It may be just as important to decide *not* to undertake certain projects.

Economy of Effort

The fact finding and analysis portion of profit planning is basic. Your plans and decisions will be as good as the data on which you base them. However, you must use judgment in deciding how much time should be spent on this "digging" phase. There is a question of the economy of effort. I think it is better to get into action on an improvement programme with 80 percent of the possible research completed than to take extra weeks or months to dot every "I" and cross every "T".

Researchers

If a problem is worth tackling it must have time and concentration in order to secure the benefits that you want. My experience tells me that you usually get insufficient of either time or attention if you attempt to superimpose this investigational work on top of current duties. Regardless of priorities, major problems do not get solved first; the day-to-day operating situations, of necessity, have the first call. Thus, I would recommend to you that you relieve at least one key man of his normal tasks so that he can give one or more profit improvement projects his full efforts. Indeed, in a complex situation, you may need to set up a "task force" or temporarily add a consulting organization to your team.

Top Management Liaison

Facts, their analysis and the resulting ideas for improvements, are intimately bound together. The researcher, the task force, the consultant—or any combination of them—should have guidance from, and ready access to, the senior executive or a top management committee. It is the responsibility of these senior officials to make whatever decisions are required and to initiate the actions to accomplish the approved plans. They should maintain a close liaison throughout the developments, not only to be informed of progress, but to keep it "on the tracks" and to better participate in the creation of ideas.

Groups and Committees

The use of groups and committees is an important means of developing your plans. It will pay well in results, and use of time, to ensure that you have available, or quickly develop, persons with adequate skills in discussion group or conference leadership.

Brainstorming

When you come to the "idea creation" stages of your investigation and you are ready for "dreaming up" new angles and approaches, I suggest that you look into the method known as brainstorming. If you will drop your inhibitions, it will pay off in ideas.

Very briefly, it is a creative activity by a small group. The ground rules are:

"1. Judicial judgment is ruled out. Criticism of ideas must be withheld until later.

"2. 'Free wheeling' is welcomed. The wilder the idea the better; it is easier to tone down than to think up.

"3. Quantity is wanted. The greater the number of ideas, the more likelihood of good ones.

"4. Combination and improvement are sought. In addition to contributing ideas of their own, panel-members should suggest how suggestions by others could be turned into better ideas, or how two or more ideas could be combined into a still better idea."

I recommend you learn about, and practice, brainstorming.

Participation

The degree of success which you achieve in improving profits will be proportional to the understanding and acceptance of the changes that must take place. You cannot start too soon to develop participation in your programme.

Unless your project is such that it must be treated confidentially, tell your key people what is on foot. Assign them portions of the task of assembling the facts. Check your findings and assumptions with

them as you go along. It is surprising how much "good horse sense" and "feel for a situation" exists in an organizational group.

I don't think one can over-stress the value of participation—first, in the development stage and, later, in the period of implementation.

Selection and Training

Research, group discussions, broad participation and even management decisions may prepare the way, but they do not in themselves improve profits.

It is my premise that profits are improved by making changes and retaining the changes as a matter of continuing practice. Almost invariably, it is people who change. There is a requirement for new philosophies, new skills, new patterns of activity.

In critical situations, the introduction of new key personnel may be the solution to promoting and effecting the required changes—either because of the pressure of time, or a lack of the required attributes within the existing group.

If this be the case, then, the seeking out and selection of the proper person, or persons, is the most important responsibility for the time being. Time and patience are essential to locate the potential candidates. Having discovered them, use all the available selection techniques—checking of former employers, interviews by several senior people in the company and appraisal by an industrial psychologist as a supplement to your own judgment.

Whether you have a selection problem, or not, undoubtedly you will have a training job of some degree. It may be informal and be accomplished, for the most part, during the investigation and analysis stages. On the other hand, the required skills may need to be developed through instruction by specialists.

In all cases, be sure that the immediate supervisors of those who are being trained receive, at least, an adequate appreciation of the new techniques or procedures that are being adopted.

Personnel and Organization Development

On the basis that the health and growth of a firm—and its profit potential—is a result of the progress of its people, I recommend to your consideration a plan for fostering and encouraging the development of people.

For each individual we try to see—with him—a personalized work career. This may be on one job, or on a series of jobs by progression. We recognize that what a man becomes is primarily a result of his own determination and self-direction. We, as his associates or superiors, can only provide aids and assist in the planning.

The deliberations and planning for each person, as an individual, incorporates group thinking and is carried out by personnel review boards or panels. The review boards comprise, at least, the man's

immediate supervisor, his supervisor once removed, and the head of that particular unit of organization. When experience and maturity have been developed in this activity, the individual and his boss will have a man-to-man discussion prior to the meeting of the review panel.

There are three stages in this review procedure, though in the discussion they will intermingle. We see the man as he is today: his age, health and energy; his job knowledge and his job performance; his personality and relationship with others. Next, the panel asks itself "What is this man's future? What are his targets for both the short and long range?" And, the third stage is that of planned actions: What can he do to help his own development and what assistance can the members of the panel (or the company, in more formal training requirements) do to assist the man grow from where he is now to where he might go.

This is *not* merit rating. It is something much more constructive both for the person and for the company. It is personnel and organization development.

CONTROLS

Because I am not going to refer specifically to any of the myriad analyses, schedules and statements which comprise the network of accounting activities, I have settled on four general aspects of controls to discuss.

Project Controls

The first I have chosen to call project controls. Here I am thinking of such things as schedules and progress reports.

Most of us get more done if we are under a little pressure. We need to set some "deadline" for ourselves and our associates.

On any programme you undertake, you must set some schedule of expectancy and insist on fairly frequent checks on progress. Timetables, charts, graphs, oral or written reports are some of the techniques. By such means you accomplish improvement and get results.

Timeliness

The term controls has two connotations: In one sense it implies a report of some form which shows the current status of a particular situation; on the other hand control is an activity—a regulatory or corrective action.

If you are not always to be "locking the door after the horse is stolen", correction must be prompt. The timeliness of reports, of facts on which to make decisions, is mighty important.

I believe that if you look carefully, you will find little "black books" and informal control records being maintained by people who are not well equipped to do this sort of thing, just because they do not get what they need when they feel they need it.

The proper information for decision-making produced promptly can in itself aid profit making.

Approximations

There is one way to help speed up the supply of facts. That is by sacrificing some of the completeness and ultimate accuracy of the information that you report. Here, I think, is an area of disagreement between the accountant and the engineer.

I am sometimes shocked in seeing cost figures, for instance, that are carried out to five or six places of decimals. Into those apparently highly accurate amounts have gone arbitrary pro-rations and distributions that make the decimals lie, even at their second or third places.

Nor, for every operating report, do you have to wait for every last voucher and memo. Why not assume that a constantly re-occurring expense will be about the same this period as it was last time?

I know that I am treading on pretty soft ground right here. I can be challenged with all the dire results of the lack of balancing and checking of your work. I know there can be such things as compensating errors and that you have probably had your knuckles rapped when they occur. But, I still maintain that there are situations where economy of effort and speed of reporting justify your taking a calculated risk. And I think that a management that is really profit-conscious should be prepared to share that risk and not be too critical when things don't always jibe.

The Thermostat Principle

The last aspect of controls with which I am going to deal is the thermostat principle. You establish a heating "plan" and the system becomes self-regulatory.

This is the effect you are after when you set limits in a statistical quality control programme. It is the type of control you have installed when you take the emphasis off "volume" and place it on "profit contribution" in selling controls—especially if a portion of the compensation is based on the profitability of the sales produced.

The widest and most productive application of this principle is in the use of budgets. Budgets are a mathematical expression of your policy of doing business and your own particular profit programme. Departures from that plan should serve as "feed-back" in the thermostat system and initiate corrective actions.

Experience has shown, I believe, that flexible budgets give a more accurate portrayal of your profit plan. Certainly, the variances from a variable budget are more meaningful; the type of action required is usually better specified.

Thus, in profit improvement, controls serve a dual purpose. They assist in assuring that your profit improvement programme is carried out as expeditiously as possible. Appropriate and timely information can lead to decision-making that in itself will lead to better profits.

FOR FURTHER READING

PLANNED PROFITS FOR THE FACTORY, by A. L. Rudell, N.A.C.A. Bulletin, March 1955.

MAKING A PROFIT PLAN, by E. C. Conley, Cost and Management, May 1955.

Implementing a Profit Improvement Programme. . .*

By G. E. MORDEN,
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Peterborough, Ont.

This case study develops the theme of change for profit improvement which was introduced in the preceding article. An actual situation is described illustrating how the outmoded methods and patterns of thought of the company involved were changed and profits doubled as a result.

OBVIOUSLY all of us in business are concerned with improving profits at all times, and in almost any business there comes a period when it is necessary to sit back and look at a specific plan for profit improvement. Usually it means changing not only equipment but the whole philosophy or approach of running the business itself.

To my mind, the difference between profit improvement and cost reduction is this; cost reduction is something that we can all take on at any time and it has maximum effects when tied in directly with a period when a company has had a rough time and this situation is clearly identified by the people who are going to carry out the cost reduction. In other words, cost reduction is simply an element of profit improvement.

I have chosen to define a profit improvement programme as a broad review of the company's position and a plan to modify that position so that in terms of equipment, people and approach, the company is better equipped to make money.

Company Background

Four years ago we employed about 300 people. We had a carpet weaving mill in Peterborough, and a spinning mill in Lindsay, Ontario, to produce our carpet yarns. Ours is a process type of industry where from raw materials such as wool and some synthetics in the form of viscose which are blended with wool in some of our products, we produce carpets. The only components that we purchase are cotton yarn and jute yarn. This means that per dollar of sales a large number of people are involved in the company versus other companies where a number of components may be assembled into the final product, the components being manufactured elsewhere.

We were about a 10% supplier and had sales offices in Vancouver, Toronto and Montreal.

Let us examine the facts of our company in relation to the economy of the country at the time and the modus operandi of the people in the carpet business. I like to divide this into two areas—one dealing with the market situation, and one dealing with plant and equipment.

Market Situation:

After the war, like many other businesses, the industry and the company enjoyed a seller's market. Unfortunately our company did

*An address to the Ontario and Quebec Regional Conference of the Society of Industrial and Cost Accountants in Ottawa on November 1 and 2, 1957.

not indulge in any long range planning in respect to review of existing equipment and how it was likely to serve eventual needs when the seller's market ultimately changed to a buyer's market. The company supplied a line of merchandise broad at the base, feeling that they had a responsibility to provide a dealer with sufficient variety from one source, or at most two or three sources, to offer the consumer satisfactory choice. In our business long runs are important so that producing a line that was broad at the base was expensive. What happened was that our competitors (both importers and Canadian producers) shortened their line and produced goods at lower costs. In addition, the taste of the public changed. Instead of pattern goods they wanted plain goods in wider widths for wall-to-wall installations.

The resultant picture indicated a need to change our marketing techniques in order to produce a lower cost line of merchandise. In particular, imports had made great inroads in the market and, generally speaking, the Canadian industry wasn't getting any bigger but imports were picking up the extra business that was brought along as part of our expanding economy.

From this we decided that we could find out what was selling best and become proficient at making long runs of the product line where the volume lay. If we could achieve this, our marketing technique would be to sell this product in volume and pull our costs down so that we could compete with imports and our Canadian competitors on a profitable basis. Since we were a 10% supplier in the market, in effect, each of our customers was going to buy from nine other suppliers. This being true, it relieved us of the responsibility of supplying any one customer with a sufficiently broad line to satisfy the taste of the buyer on the firing line.

Plant and Equipment:

From the standpoint of equipment, we examined our mill and found that we had looms no wider than 9′ and yet the public were demanding mostly 12′ goods and some 15′ goods. We used an index of dollar production versus dollar capacity on a one-shift basis in order to see how much mill capacity we were using. The index was at the 60% level even with some selective shift work.

These are the facts of the case—we had the wrong marketing technique and we had productive units which were not completely in tune with what the market wanted.

Obtaining a Fresh Outlook

Let us turn to the people part of it. One thing that Mr. Manuel stressed is change, and to me this is of vital importance. If we are going to have a profit improvement programme which involves changing philosophies, then insofar as people are concerned we either have to change the people or change the minds of the people that are

there—this isn't easy. In the case of our company, the directors elected a new president and employed myself as general manager. One important element in this big change was that both the president and I had come from other industries and, therefore, had no inhibitions. I am sure you have all heard the remark "we do things this way because we have always done them this way," when what is required is a fresh look at the situation. It was easy for us to take a fresh look because of a complete lack of "built-in" habit pattern. There is no doubt that it is possible and practical for people to change their whole approach. It is, however, extremely difficult for them to do, particularly if there is a long history of the present way of doing things and the people on the scene have been there a long time. What is usually necessary is outside motivating force that overcomes emotion and appeals to logic. In our case, on review of the people available to do the job, we believed that we had capable, adaptable people and subsequent events have borne this out. What we needed was to organize ourselves into a team which was different in pattern from the approach that had been taken.

One basic difference in the approach we took was to establish a democratic rather than a bureaucratic atmosphere with a complete lack of politics. Just how this was accomplished will be told later.

Overhauling the Costs

The only senior person we engaged in the early months of the programme was a cost accountant. At that time the costs that were produced were based on a six month period. To explain, we collected all our manufacturing labour and overhead charges for the six month period and distributed these on an actual or some other appropriate basis to the respective cost centres concerned. Production for the period was collected in the same way and related to the total expenditure of each cost centre for labour and overhead thus providing labour and overhead unit costs for each cost centre or process. These units with appropriate material costs and quantities were then applied to carpet data sheets for each quality. The data sheets were then computed producing a six month cost for each quality which was used for inventory pricing and quotation purposes. Quite obviously the guidance was getting pretty ragged at the end of the six month period when again the costs were to be rolled. Mind you, they were adequate for the period for which they were being used before the war when the market situation permitted. In any event, we hired a very able cost accountant and he went to work. Because he started from scratch and the job was complex, it was upwards of two years before we could generate cost data on a monthly basis for guidance in establishing selling prices and relieving inventories to determine a monthly profit position.

Now we have established two things, we feel we know what is wrong with the company basically, and we have the people to do the job if we get ourselves properly organized.

Organizing Committees

We chose to set up a group of committees to deal with our planning and control or review problems. We made use of the always intelligent and important principle of using "all of the brains of all the people" and achieved a high degree of participation in terms of having people feel and accept responsibility for the way the company was going.

We arranged the organization of five committees as follows:—

The Factory Planning Committee is our largest committee and has had the biggest job to do. It consists of the general manager, secretary, mill manager, production manager, manager of factory services, personnel manager, cost accountant, purchasing agent, and treasurer. All phases of top management are represented. The job of this committee has been to recommend and plan the installation of new capital equipment, recommend change in layouts, special maintenance, policy in union matters, priority for time studies, etc. The work of this committee has been of paramount importance. Meetings were held about once a month, almost always out of the plant away from the telephones and in a relaxing atmosphere. I am confident that this approach has been rewarding and highly recommend it for long important meetings.

The Merchandising Committee consists of myself, manager of product planning, manager of design, sales manager, secretary and, on call as required, the purchasing agent and mill manager. The main function of this committee is to plan products so that satisfactory profits can be enjoyed, and so that those products are suitable to the equipment on hand and can be merchandised at a price the consumer will pay. All this, of course, is standard but we didn't have it before and the function is vital for the good health of our organization. This committee, having the representation it does, gives guidance to those responsible for recommending the type of equipment we should purchase. The function of product planning had in the last few years become increasingly important and was finally recognized as a very separate function. This committee still functions as it was originally set up and meets about once a month. Most of the recommendations and decisions taken by the committee are implemented by the manager of product planning and subsequently by the sales manager when the products get to market.

The Production Scheduling Committee was set up to perform the function its name implies. The committee was composed of the manager of factory scheduling, sales manager, personnel manager, and mill manager. At first I acted as chairman of the committee but now the manager of production scheduling chairs the meeting and, in addi-

tion to the group mentioned, he calls in the appropriate foremen each week to deal with their own specific part of the production scheduling.

The Wage Rate Committee consists of the personnel manager, cost accountant, production manager, time study manager, secretary of the company, and the treasurer. Their function is to study wage rate and incentive structures and agree on what they should be. This has been a big job, as we have been getting caught up on the past, changing methods, and installing new capital equipment.

The Purchasing Committee consists of the purchasing agent, the secretary and the mill manager. The purchasing agent, of course, handles the routine purchases on his own. The committee is necessary because of the large material content in our end product which warrants a close watch on raw material costs, particularly of wool, the cost of which is influenced by world markets. This committee recommends changes in our maximum-minimum purchasing arrangements as the market situation indicates.

Through simple organizational charts showing clearly the interrelationships between functions and job descriptions, and the use of these committees, we were able to effectively organize our activities so as to bring about the desired result. I should like to point out that, although it may not be too obvious from the foregoing, we took great care to see that the committee structure overlapped sufficiently to provide good communication throughout the whole organization. There is danger in the committee approach because important items have a way of getting lost. Later on I'll explain how we avoided this pitfall.

One more important word on committees. We never take a vote on issues but always seek agreement. This is easier to do than it appears. You simply ask the minority to justify their position and if they can sell the others, fine. If not they are in no position to continue disagreeing.

Establishing Controls

At the beginning the control was mostly of the "seat of the pants" variety, supplemented only by reviews every six months of actual inventory and historical process costs. It is amazing the system worked at all but in the old days in many businesses it was all they had. We had to establish a whole package of comprehensive and adequate controls and our cost accounting here plays a very great part.

A summary of the main controls established so far appears quite formidable but such controls are nevertheless highly essential.

1. The first step was to establish process costs on a monthly actual and continuing basis. These were obviously required for the determination of current actual product costs, which enabled us to set up and maintain monthly book inventories

for work-in-process and finished goods accounts. From these book inventory figures we were able to determine our monthly cost of production and more particularly cost of sales, thus establishing the basis of gross margin and monthly profit picture. These inventory figures, of course, were complemented by perpetual inventories of supplies, all of which were subject to verification semi-annually through physical inventories.

2. We then established annual budgets which were reviewed monthly and revised if necessary at the half-year in keeping with changed conditions. These budgets cover manufacturing expense including maintenance and repair, administration, selling and advertising expense, cost and sales forecasts.
3. Having established these procedures and controls, we were able to forecast gross margin on a realistic basis. This, along with other pertinent budgetary information, provided us with the necessary tools to prepare a complete profit and loss budget.
4. Labour and overhead control reports were then installed, being tied in with our books of account. The labour control report is a weekly control and is analyzed on that basis. The overhead control report is a monthly report and is compared with the previous month, number of months to date, current year and previous year.
5. Forecasted statements of each requirement were prepared on a semi-annual basis. These in turn were tied in with weekly and monthly statements of cash position.
6. A programme for the control of capital work in progress was introduced to control the outlay of investments in new capital equipment. Separate appropriations and numbers were raised to cover each installation and to insure that each item of expenditure was adequately provided for, controlled and allocated.
7. A series of graphs were implemented to check timetables and progress for planned capital installations, layouts and disposals.
8. A further series of graphs were set up and maintained of some of the more detailed processes such as monthly cost of yarn by yarn count and yarn production performance standards and tolerances.
9. Priorities were set up to determine which areas should receive review of incentive rates, layouts or methods. A plan was then prepared in graph form which is checked periodically by the factory planning committee. However, we are having

some trouble in deciding on priorities. We find it isn't easy to establish the proper priorities when one has to consider the balance of needs between the personnel department who may have an unhappy area because of rates and the potential savings in overhead, increased production and labour.

10. It was necessary to set up an entirely new quality control department with its own complex set of control reports.

11. This control I have saved for the last because I consider it the most important and it is a control not usually considered or identified as a control. It is the writing of brief but complete minutes of the committee meetings, prepared and circulated no later than the day following the meeting. This is how we avoid having items "buried in committee". The minutes of the last meeting are dealt with item by item so that the person responsible for carrying out a certain task is asked to stand up and be counted by his peers. I don't believe there is any stronger motivating force for all of us to do our best than our desire to be thought well of by our fellow men—particularly those on our own special team. There is a most important feature to remember in respect to committee structure. The committee should consist of the heads of those departments that are affected by the matters under consideration by the committee; the chairman of the committee should rule as an impartial decision maker, having the guidance of all the appropriate people.

    The exception to this rule is, of course, when a policy is being considered outside the powers of the decision maker; then a recommendation rather than a decision for action results.

Some examples of how specific controls worked out may be interesting.

Yarn Production Tolerances

The prepared graphs of yarn tests in relation to yarn tolerances indicated that production tolerances were not being maintained. One type of yarn which was used in great volume over a period of time was 8% heavy as against a tolerance of 5%. This meant that we were using 8% more yarn in the carpet than was called for in the specifications. This meant we had estimated costs over the period in question to be lower than they actually were by nearly $11,000 and that gross margin on the product was affected by 4%. The bulk of this yarn was supplied by commission spinners and not done in our own mill. The indications of course were clear that we must tighten up the inspection and refer to tolerances more frequently so that any error could be picked up more quickly.

Spot Lot Wool Buying

In an endeavour to hold our average raw wool cost down in a rising market, we were purchasing one particular type of wool on a spot lot basis. This offered a price advantage and enabled us to save a cent or two a pound more than if we purchased the wool on a longer term basis directly from the country of origin. During the period in question, it was noticed that the shrinkage of yarn weight from raw material was greater than normal, varying as much as 5%. After careful investigation this was traced to the spot lots of wool and analysis indicated that the saving in their price was more than offset by this high shrinkage. We returned to purchasing wool from the country of origin on a long term basis with a net saving of three to five cents per pound on yarn.

Average Earnings

During the formative stages of the new broadloom weaving department we found that approximately 28% of weavers' wages were being paid on the basis of average earnings and this was costing us $800. per month. The average earnings were paid for two reasons:—

(1) For substandard running conditions.

(2) For mechanical breakdowns beyond the control of the operator.

It was determined that average earnings paid for mechanical breakdowns beyond the control of the operator were a small percentage of the earnings. The difficulty lay in that we had left the determination of substandard running conditions too much to the discretion of the operator. Since his view differed from what we considered to be a fair determination, we introduced a system whereby he had to get the approval of his foreman before he could be paid under average earnings conditions. Through this increase in formality, the average earning time paid was reduced by well over 60% with consequent improvement in costs.

The above three points are examples of what can be done by the accounting department through their own established formal and informal controls as they become familiar with the task at hand and have basic analysis and reorganizational problems behind them in a new business or a business with new conditions.

Cost Reduction

Two years ago we introduced a cost reduction programme which was highly effective. We first of all solicited ideas from all the foremen at a formal meeting and came up with 27 specific areas. We also brought our union into the picture and organized the attack.

The initial effort resulted in savings estimated at $50,000. annually. Some of the things we did were as follows:—

1. Shortened the break period and arranged it so that the foremen had much better control.
2. We purchased some new cleaning equipment at a cost of $500. permitting us to release two people.
3. We had the truck driver work inside when he wasn't involved in taking care of necessary transportation and, as a result of this and other moves, were able to reduce the staff by one more person.
4. In an area we found our watching schedule provided for 23½ hrs. of watching when the mill was running. By rescheduling we were able to save this time.
5. We arbitrarily reduced floor sweepers from three to two and reassigned their areas of responsibility.
6. We reduced the floor help in other areas and solicited the support of the remaining hourly paid people, and in some cases pieceworkers, to pick up the load that was left.

The cost reduction programme is still working effectively, although the attack is less formal. It is not necessary or desirable to maintain constant high pressure. Other important jobs we feel would suffer.

Conclusion

By the techniques described above we have been able to improve profits substantially. We are now billing at roughly twice the dollar value and unit sales we were four years ago and yet our employee population has increased by only 100. Naturally our costs are better and this is what has permitted us to reduce selling prices and achieve higher volume levels. We are far from satisfied with the degree of our profit improvement and are continually planning to "improve our profits".

FOR FURTHER READING

ORGANIZING A PROFIT IMPROVEMENT PROGRAMME, by G. W. Chane, Controllers Institute of America.

PLANT TEAM FINDS PROFIT IMPROVEMENT, by H. R. Siebach, N.A.C.A. Bulletin, Feb. 1957.

A Cost Accounting System for the Manufacture of Paint. . .*

By Jack R. Arbing,

Assessor, Income Tax Division, Department of National Revenue, Toronto, Ontario.

In this article the author gives a detailed description of a cost accounting system for the manufacture of paint or enamel from departmental organization to the final labelling.

THIS work will deal mainly with paint or enamel but the principles herein developed can be applied to accounting for the manufacture of lacquer or varnish with very slight changes.

Processing

Paint manufacture entails first the mixing of dry paint pigments with oil or varnish liquid. Next is the grinding process where lumps and seeds are dispersed. Different grinding machines are used for different products.

After grinding the paste is poured into a tank and a further reducing liquid such as varsol or turpentine is added. The batch is then tinted. One tint is tested to a standard and put into containers. Small packages for the dealer trade may be filled by automatic machines but the larger five-gallon and drum packages are usually filled by hand and shipped at once. The cans, labels, cartons and lids are usually purchased from an outside source and their cost is easily established. It is a good plan to mix on the top floor and fill on the ground floor.

Departments:

For purposes of administration and operation each works is divided into departments and functional areas of responsibility. Each department is normally the responsibility of an individual who is accountable for the production or services of that department and for the costs incurred in its operation. In some cases two or more distinct functions such as reducing and tinting are included in one department; additionally a department may contain two or more different types of equipment doing substantially the same type of operation, such as grinding.

The two main groups of departments are:

(a) Processing departments which are those directly concerned with the manufacture of the product, such as varnish, grinding, filling, etc., and,

(b) Service departments like power, cleaning and accounting which provide services to the processing departments.

In the processing departments the costs incurred can, in general, be identified with products by measuring the effort or time spent by the department on each product or product group. When there are different functions or types of equipment in a department, the measurements and

*This is a condensation of a thesis submitted for the R.I.A. degree.

costs must relate to the particular operations rather than to the department generally. For example, in grinding it is not sufficient to measure the pounds, machine times, man hours and costs for the whole department; the data must be accumulated by type of grinding equipment.

Occasionally it is possible to relate service department costs to processing departments by measurement of service provided. In general, however, such measurements are costly and time consuming and, while desirable for specific studies, are not practical for monthly costing. Accordingly, for purposes of arriving at product costs, arbitrary bases are used to distribute service department costs to processing departments and hence to products.

Code Numbers:

The use of code numbers facilitates and simplifies, reduces clerical work and aids in avoiding errors in handling materials. A comprehensive system can easily be established to identify the individual raw materials and finished products.

Material Costs:

Raw materials may form about 70% of the cost of finishes and include all raw materials used in manufacturing the product. The cost of available material on any given day is usually that of material purchased 30 to 60 days previously. A card for each raw material is kept showing the name and code number, etc. The reverse side may show the supplies issued. Freight and handling costs must be included.

Evaluation of Performance:

To assess the performance of an individual responsible for a department or operation, the standards expected must be clearly defined, attainable and agreed with the individual concerned. Furthermore, the limits within which variations will be acceptable to higher supervision must be established.

In the manufacture of paint, standards could be determined if the laboratory, when formulating a product, established the time or other controlling factor required in each operation through which the product is processed. It would then be possible to assess the performance of a processing department or operation in quantitative terms such as in terms of the ratio of standard time to actual time. It must be recognized, however, that there are a number of variable factors in paint manufacture; some are inherent in the product such as chemical reactions or hard grind pigments, and some are man-made such as extra cleaning due to changes in colours processed through an operation. To the extent that these factors are foreseeable or are known to occur at fairly regular intervals, allowance may be made for them so that the standards then represent average attainable performance over a period.

Costs for Control Purposes:

It follows, that a prime function of the cost system is to provide data for measuring and comparing work performance and costs. To this end Operating and Cost Summaries are prepared monthly showing the direct costs incurred by each processing department, the quantities processed and the facilities used by each operation or cost centre within the department. These summaries are intended to provide works supervision with data to control operations and to stimulate enquiries into operating practices with a view to cost reduction through new techniques and more effective utilization of plant and man power.

Control over works service department costs is effected by means of a predetermined budget or forecast. Monthly reports of indirect costs are prepared by functional account comparing actual expenditures with the budget or forecast.

Product Costs:

As a batch moves through the plant, the number of process units recorded at each operation is entered on the batch card. The batch cards representing production completed during the month for one saleable or intermediate cost group are summarized to provide the total process units by operation for that group. The process units by operation multiplied by the standard operation rate determines the cost for that operation charged to the group. The sum of these calculations for all operations applicable to the group determines the total manufacturing costs for the group excluding materials.

Cost Reports:

Reports are prepared monthly to provide works management with a review of the month's activity. They cover the two main sections of the cost system: control and product costs. The control reports include the Operating and Cost Summaries and Indirect Expense Reports already mentioned and a Cost by Operations Report. The latter shows, by operations, the forecast units and costs for the period, the actual costs incurred and the units processed costed at the standard operation rates.

The difference between the actual costs incurred and the cost charged to goods processed at the operation rates represents the undistributed production cost for the month and is analyzed to determine the amount attributable to variations in expenditure from forecast, volume changes and other factors.

The Cost of Production Report shows the quantity and cost of production for each cost group and in-process group. Costs per unit are shown by major cost elements such as ingredients, making and filling. To facilitate comparisons, the average batch size is also recorded.

Sales Costs:

It is considered that sales cost should be prepared at the works where the product is made in order to take advantage of local ex-

perience, production know-how and production and cost records. However, sales costs may be prepared centrally where the only record available is the standard formula card from which ingredient costs and other operation costs can be readily determined.

To compute sales costs it will be necessary to establish grinding times for all grinding other than ball mills for each product and also the batch size to be costed. The latter point is important as some operation costs such as ball mill grinding, tinting and filling are constant irrespective of batch size. Thus as the batch size decreases the cost per gallon increases proportionately.

Initially it is suggested that grinding times may be established by preparing a schedule showing, by type of equipment, grinding times per 100 pounds of mill base for representative groups of products such as flat wall, semi-gloss, etc. If each product is identified with a grinding group, then the grinding time for any batch size may be easily determined.

In deciding what batch size to cost for sales purposes two factors are involved: the anticipated sales volume of the product and the equipment limitation at the works. It is suggested that the sales department indicate on requests covering new products the batch size envisaged. For existing products the normal production size should be recorded on the formula card.

A written request for a sales cost stating the anticipated batch size and filling instructions should be forwarded to the chief works accountant who will have the cost prepared through the formula card and grinding schedule. The cost is reported to the sales department as a factory filled cost per gallon for a given batch size. The cost per gallon for any batch size can be computed from the original cost calculation.

The Cost System and the Books of General Account:

The factory handles all transactions dealing with the actual manufacturing of the product. Purchases are made and paid for by the branch but all sales and accounts receivable are managed at the head office. The factory general ledger contains a cash account built up from advances from the head office and accounts for the fixed units used in production plus the appropriate reserve accounts. The head office books contain a Paint Works account and the factory ledger shows a Head Office account; through these accounts are recorded all transactions between the works and the main office.

When the necessary entries have been made to record the cost of goods manufactured, the factory ledger will show these costs in a Finished Goods account. When a sale is arranged the head office will notify the branch with an Instructions to Ship form and the necessary items will be sent direct to the customer. Head Office will be notified

of the shipment and the cost so that a debit to Cost of Goods Sold may be made. At the factory, Finished Goods will be credited and Head Office will be debited. At the end of the year the Finished Goods account will be closed out to Head Office.

Outline of Monthly Procedures:

As the cost system revolves around the Batch Card (Form No. 2) and entries on the batch card, an outline of monthly costing procedures must therefore revolve around the way in which the batch cards are handled.

The "Order to Fill", (Form No. 1), is one of the first steps towards the making up of the batch card. When an order for paint is received at the plant from head office and a sufficient quantity is not on hand or when the inventory of a particular line is low, the Inventory Control Section will issue an order to fill and forward it to the Production Scheduling Section. The Production Scheduler checks the required dates and has batch cards made up as needed.

Batch cards are written up by the batch card clerk from formula cards. These formula cards are prepared by the laboratory and show by code the ingredients which are normally necessary to produce a certain quantity of finished product. After the batch card is prepared, the clerk records the code, batch number and order to fill number in his Control Book. At the same time he makes out an Index Card (Form No. 3) for that particular line code. This card is a record for all batches in the line and the batch number, date, size of batch, yield and order to fill number is recorded on it when completed.

When a batch card has been made up it is returned with the order to fill to the scheduler. At the proper time he forwards the card to the Paint Production Department to be put in process. If any substitutions are required they are entered by the laboratory and the card is returned. The card follows the batch through the production process. As a batch is processed the operators enter on the card the process units applied in each operation and the quantity and size of containers filled. The batch card leaves the producing department only at such times as tests are being made on the batch. These tests are recorded on the card. When the batch has been filled and the number and sizes of containers filled entered on the card, it is sent to the laboratory so that they may post the yield of the batch and results of tests into their own records.

After the laboratory forwards the card back to the batch card clerk, he stamps the date completed on the card and in his control book and records the yield and date on the index card. From here the cards go to the production ledger clerk.

The production ledger clerk extends all ingredients which have a plus or a minus and marks the net input of these ingredient codes in the margin to the right of the card. The total of the ingredients used is recorded in the space marked Total Input. The yield of the batch is

ORDER TO FILL

No. 6715

AUTOMOTIVE		SPECIALTIES		INDUSTRIAL		REFINISHING		RETAIL

DATE	BATCH STARTED	REQUIRED	CODE
SALES ORDER NO.	O.K. TO FILL	PROMISED	BATCH NO.
	LAB REFERENCE	DELAYED PROMISE	QUANTITY

PRODUCT:

CUSTOMER:

SPECIAL INSTRUCTIONS:

ISSUED BY APPROVED

	DRUMS	5 GAL	1 GAL.	1/4	1/16	
CONTAINER NO.						
FILLING						

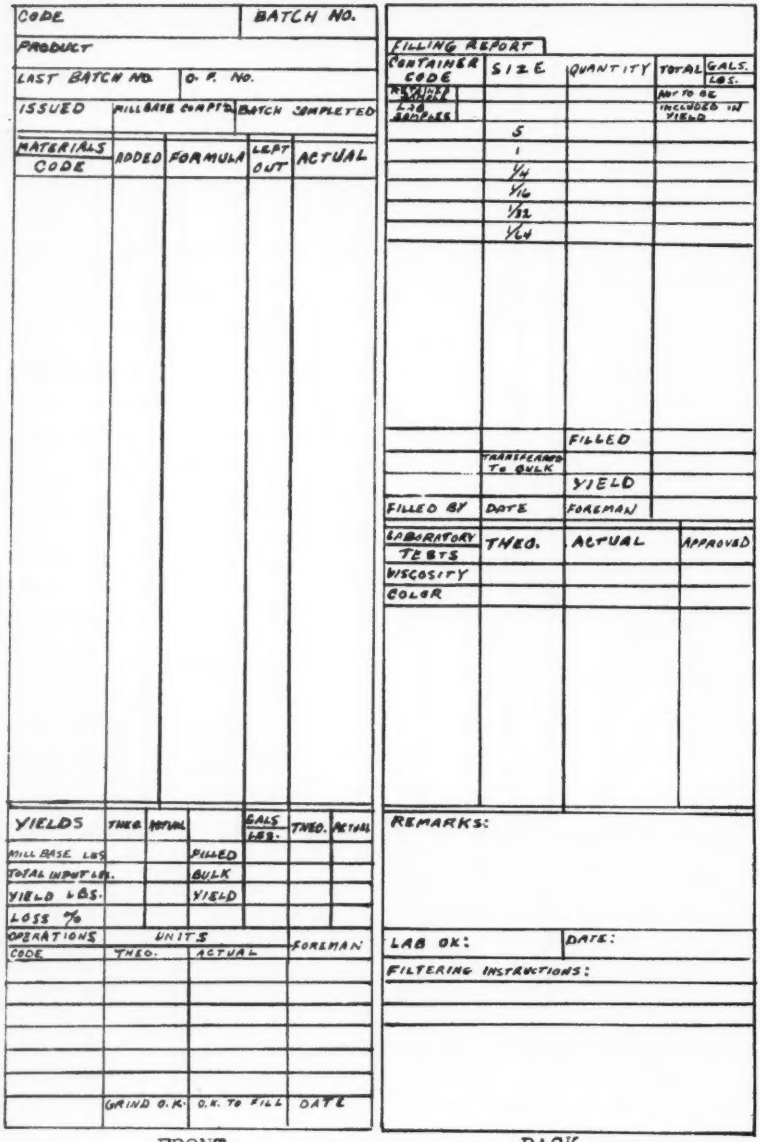
OFFICE

TRANSFER FROM QTY	SIZE	STYLE	TRANSFER TO QTY	SIZE	STYLE	CHARGE

PLANT

TRANSFERRED FROM QTY	SIZE	STYLE	TRANSFERRED TO QTY	SIZE	STYLE	BULK

Form No. 1



FRONT BACK

BATCH CARD
Form No. 2

INDEX CARD
CODE ——— No.

O. to F. No.	ORDER LBS.	STOCK GALS.	BATCH CARD No.	ISSUED	YIE LBS.	LOS GALS.	EMPTD	REMARKS

Form No. 3

computed in pounds and entered and the loss or average is found. The percentage loss or average is also calculated and any large differences are reported to the supervisor concerned to be approved by him.

The batch cards are then put in blocks and adding machine tapes taken of the yields. The blocks usually consist of one day's cards but would vary in accordance with production. The totals of the blocks are posted to the Control Account to ensure that the proper yields have been posted and added in the individual line codes because the total of the group yields must agree with the total shown in the control. A control is set up for each key group such as Automotive, Refinish, Industrial, Retail, Specialties, Miscellaneous and Intermediates.

When the batch cards have been approved by the paint supervisor, they are ready for posting in the Production Ledger. There is one page or more for each line code and the cards are posted by blocks to the appropriate code. Since the lines of the production ledger are numbered, the card is given the number of the line on which it is posted and this number is entered on the card. The batch number, input units, gallons or pounds yielded, operational units and details of containers filled are posted into the ledger.

After all the cards for the month have been posted in the production ledger, the yields, input units, operational units and containers filled are added. When this has been completed for each line code, the totals of the yields for each line code in each key group are added and balanced to its control account. The totals of the operations, containers and batches filled are posted by line code to a Master Sheet or Production Ledger Control Sheet. When all of the line codes are posted on this master sheet, it is totalled and priced using the current making and filling rates. The master sheet serves as a control for the costing of the production ledger as well as a source of information for the monthly cost reports. When the master sheet has been completed, the ledger is priced using the current making and filling rates and balanced to the master sheet. The raw material filled for sale and other miscellaneous transfers, etc., are added to the master sheet to obtain the total absorbed expense for the period. This is done after the ledger is balanced since these miscellaneous items are not kept in the production ledger but on separate recap sheets.

When the batch card has been posted into the production ledger and assigned a number, it is ready for posting on the Ingredient Recap Sheets. The ingredient recap sheets (one for every line code) have the raw material ingredient codes for the particular line code listed down the left hand side of the page. On the reverse side of the page the intermediate ingredient codes peculiar to that particular line code may be listed. The sheets have as many columns across as the production ledger pages have lines. The batch card is posted on these sheets in the column which has the corresponding number to the card and therefore to the line number on the yield sheet in the production ledger. The amounts posted must agree with the figure in the "total input" section of the batch card. The corner of the batch card may then be cut off to show that it has been completely processed.

As a sheet is completed, it is balanced across and the totals carried forward to a new sheet. Therefore the total ingredients by ingredient code used in that particular line code are on the last page of the recap sheet of that line code.

When all the cards for the period have been entered on the recap sheets, the raw material and intermediate sides of the sheets are added and cross balanced. The grand total thus obtained by line code must agree with the total shown in the ingredient units column of that line code in the production ledger. This procedure is carried on for each line code that was active during the month. Balancing to the ingredient unit column in the production ledger ensures that the proper cards have been recapped for that group and that no cards have been overlooked.

After the sheets have been checked, the ingredient codes are priced on the recap sheet and the total value of raw materials and intermediates is determined by code. Then the total of all the raw material and the

(f) Filling cost forms the Production Ledger.

When all values have been entered they are allocated to bulk and saleable gallons on a percentage basis, if applicable, and the amounts are totalled and balanced to the total unfilled cost column since filling will not be applicable to the cost of bulk gallons. The filled cost is found by adding the unfilled cost of filled gallons to the value of the containers, labels, cartons and filling in the line code. This sheet contains most of the information required for the production journal entry voucher and the quantity and value of bulk produced for the intermediate ledger keeper.

The production analysis sheets provide the data for the Production Analysis Ledger. The filled gallons and all costs applicable to the filled gallons being set down on the sheet by line code furnish the information exactly as it is required and are merely copied by line code into the ledger. Per unit costs are then computed in the ledger.

The Daily Work Reports which are made out by the operators in the plant provide the data for the Operating and Cost Summary. There is a daily work report sheet for every department and each department shows every batch, completed and uncompleted. Therefore each day the state of completion of every batch is known. Any pertinent remarks about a batch are recorded on this sheet by the operators. They also mark down the actual operational units used up on a particular finished batch, such as pounds mixed, machine hours, gallons reduced, etc. A cost clerk collects the information day by day from this sheet and at the end of the month adds up the total units consumed in each department. These units are posted to the operating and cost summary. Batches, gallons, pounds, machine hours, fire hours, etc., are posted along with other pertinent information such as man hours and direct costs. From these figures percentages and other comparable units are computed.

The direct costs are made up of direct labour, supplies and services, maintenance labour and maintenance supplies and services. Cost of direct and maintenance labour is obtained from the payroll clerk and the supplies and maintenance supplies, etc., from the works ledger. The totals shown by each department must agree with the totals shown on the works expense sheets.

From the operating and cost summary the Production Cost Sheets are prepared. These sheets are made up of comparative figures. Data for three months along with the same month a year ago is collected and set down. This report deals almost entirely with unit cost or unit production. Thus we have pounds or gallons per day, per man hour, labour cost per 1000 pounds or gallons, etc. These sheets are used in the monthly cost meetings with the foremen but actually are not part of the cost system.

At the same time as the production cost sheets are being prepared, a similar report is made out for the warehouse. Total batches and

total of all the intermediate codes are taken and put down on the lower right hand corner. These totals are used at a later time for balancing purposes. The individual ingredient codes are then posted to the raw material and intermediate Ingredient Cards. Both the pounds and the value are posted in this case. When all the ingredients and values have been posted from the ingredient recap sheets, the ingredient cards are totalled. The values on all the raw material cards are added and balanced against the total of the values of the raw material codes shown on the lower right hand corner of the recap sheet. The same is done for the intermediates They are done separately for convenience purposes only.

Once the cards are balanced they are taken by the intermediate and raw material ledger keepers to credit their ledger. As they post each code, they extend the total pounds by the unit price for the product. This guards against errors in additions and postings of the pounds on the cards since only the values have been balanced up to this point.

Total theoretical making costs in each line code are based on the total units processed during the month. Naturally some of these units were used up in the making of gallons which were not filled as a saleable product. Therefore the Production Analysis Sheet is used to separate the cost of making saleable and bulk gallons.

This sheet has the line codes listed down the left hand side with the gallons filled and the gallons bulk set down and totalled. The percentage of filled and bulk gallons to the total gallonage is calculated. Along the top of the sheet are listed the columns for:

(1) Value of raw material,
(2) Ingredient cost of intermediates,
(3) Making cost of intermediates,
(4) Total cost of intermediates,
(5) Shrinkage,
(6) Making cost,
(7) Total unfilled cost,
(8) Containers,
(9) Labels,
(10) Cartons,
(11) Filling cost, and,
(12) Total filled cost

Information for this sheet is found from the following sources:

(a) Gallons from the Production Ledger,
(b) Value of intermediates from the Ingredient Recap
(c) Value of raw material from the Ingredient Recap,
(d) Making cost and the value of containers and labels from the Production Ledger.
(e) Carton value is allocated on the basis of the percentage of value of containers in each line code, and,

gallons handled by assemblers and packers are obtained from inventory control and labour costs are collected from the payroll clerk. From these figures a cost per batch, cost per gallon, gallons per batch, etc., picture is available for the foreman. Total batches and gallons handled by the warehouse are compared with total manhours and labour cost to permit monthly comparisons of warehouse efficiencies.

Containers are posted by size and type into the production ledger from the batch cards. When all the cards have been posted, the containers are added and summarized on the yield sheets by size and type in each line code. To obtain their value they are extended by the price of that size and type. When each different type of container group in the line code has been extended, the values are added to obtain the total value of containers used in the line code.

When all line codes have had their container values calculated and added, the different sizes and totals (quantity and value) are posted on an ingredient card. There is a card for each size and type of container. These ingredient cards are totalled and the values are balanced to the total value of containers in the production ledger.

After the cards are balanced for value they are taken by the raw material ledger clerk to credit the different container accounts. The number of containers on each card is extended by the rate for that particular type and size to check additions and postings before posting into the ledger.

As the cost clerk prices the containers in each line code ,he also calculates the number of labels used in that line code. This is done by totalling the containers that take a label and adding say 10% to allow for spoilage. When this total is obtained, the unit cost of the labels is applied to give the value of labels used in the line code concerned. When this has been completed for each line code, the total quantity and value is used by the raw material ledger clerk for crediting the ledger.

The Production Cost by Operations Sheet is drawn up to show by operation the forecast units and costs for the period, the actual costs incurred and the units processed costed at the standard operation rates. The difference between the actual costs incurred and the cost charged to goods processed at the operation rates represents the undistributed production cost for the period and is analyzed to determine the amount attributed to variations in expenditure from forecast, volume changes and other factors.

Information for this report is obtained as follows:

(a) The forecast of units and the forecast of dollars is computed by taking the number of working days in the period over the total number of working days in the year times the forecast of units or dollars for the year.

(b) The actual units consumed during the period are taken directly off the production ledger control sheet.

(c) The actual direct dollars expended are obtained from the operating and cost summary.

(d) The absorbed cost is obtained from the production ledger control sheet.

(e) Indirect expenses are obtained from the Works Expense Sheets where local, general and production services indirect expenses are itemized.

An Analysis of Expenses—Over or (Under) Absorbed indicates the following variances:

(a) Forecast Direct

(b) Forecast Indirect

(c) Volume

(d) Calendar

The forecast direct variance figures represent the difference between the actual figures for direct labour, direct supplies and direct maintenance charges and the amount forecasted for the expenses during the period. The actual figures are obtained from the operating and cost summary.

The forecast indirect variance figures represent the difference between the actual figures for indirect labour, supplies and services and head office charges and the amount that would have been absorbed in an average month (one-twelfth of the year's forecasted expense). Actual figures are obtained from the works expense sheet.

Volume variance figures represent the difference between the value of those units which should have been processed during the period at the forecasted rate of production and the value of the units actually processed during the period.

The calendar variance is an indirect variance which arises when the number of working days in a month deviates from one-twelfth of the total working days in the year.

FOR FURTHER READING

COST CONTROL IN THE PAINT INDUSTRY, by C. G. Davison, The Controller, April 1957.